

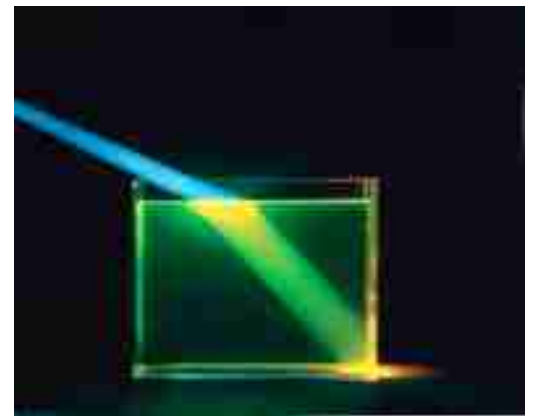
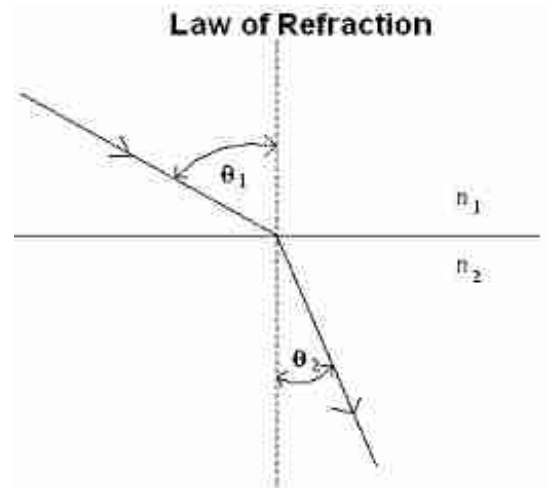
## Refraction of Light

Light bends as it exits one medium and enters another. This process of “bending light” is called **refraction**.

How is refraction different from reflection?

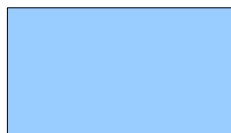
Light rays bend **towards the normal** (the line at 90° to the medium's surface) as it slows down

Light rays bend **away from the normal** if it can speed up.



Another way to think about it...

**Fermat's Principle** says that when light travels from one point to another, it follows the path that will take the least time. In a single medium, this path is a straight line. In two or more media, this path is not necessary a straight line – it is often bent.



The **index of refraction** for a medium is the ratio of the speed of light in a vacuum to the speed of light in the medium. Slower light → higher index of refraction.

$$n = \frac{c}{v}$$

where:

$n$  is the index of refraction

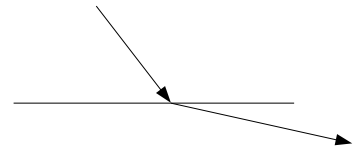
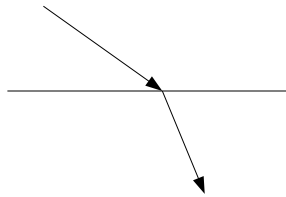
$c$  is the speed of light in a vacuum ( $3.00 \times 10^8$  m/s)

$v$  is the speed of light in the medium

## Homework

1. If the speed of light in a medium is  $2.4 \times 10^8$  m/s, what is that medium's index of refraction?
2. Look up online which material has the highest index of refraction known. How slow is light in that medium?

3. Which of the diagrams here represent light going from Air  $\rightarrow$  Water and which represents Water  $\rightarrow$  Air? How do you know?



4. Pg. 455 #1-3 (use table on Pg 454 to help you)